

Appendix 7B

In Pavement Marking Memorandum

MEMORANDUM

To:	Alex Shkerich, Atelier Leslie McLean, King County	Date:	July 19, 2005
From:	Jennifer Lowe	TG:	03292.00
cc:			
Subject:	Burke Gilman Trail: In Pavement Marking		

At your request, I attended a demonstration of LED in pavement markers by Glenn Radford, Director of ITEM Ltd. on June 21st. This memo contains my notes and thoughts on the system and the potential applicability to the driveway crossings on the trail. The purpose of this memo is not to be a “naysayer” to the technology but just to raise awareness of some of the things that should be considered related to its application at Burke Gilman Trail driveway crossings.

General Comments

Providing the needed sight triangles and proper Yield assignment to the driveway approaches at the trail crossing is critical. Any other measures, test, or otherwise, should not be taken without first providing these treatments. Once the provision of these measurements have been undertaken, the additional warning measures, such as LED flashers, is probably unnecessary. Furthermore, because of concerns about needed stopping distance and creation of a false sense of safety for both trail and driveway users, we do not recommend their application on the trail.

In pavement LED lighting is gaining popularity in midblock and minor intersection pedestrian crossings of public streets. Concerns that surfaced in the early stages of installation, such as durability, dependability, sensor problems, have been improved with the evolution of the technology. There are many instances where the installation has been positively embraced by jurisdictions and pedestrians. The benefits are that they are dynamic: addressing concerns about static pedestrian crossing warnings that tend to be ignored by drivers if little pedestrian activity is experienced. While mid-block pedestrian crossings are typically discouraged, there are times when they are appropriate (due to block length or major uses that generate crossing activity that cannot be directed to the closest crossing). However, experience/applications for bicycle/multipurpose trails is minimal (no immediate examples were found or referenced by the product vendor). Likewise, application to driveway crossings are also currently unidentified.

Through the course of the discussions and thinking about how this technology could be applied to the trail, three different scenarios for placement of in-pavement flashers would be possible. I have defined these and identified some questions/concerns I have about these. A fourth option, though not “in-pavement” resulted from my discussion with Mr. Radford after the CAG presentation.

Potential Applications to Burke Gilman Trail Driveway Crossings

Scenario 1: Sensors across driveway approaches, LED warnings across trail

How it would work: as vehicles on driveways approach trail crossing, sensors activate LED system in trail, activating warning.

In the case, the desired effect would seem to be to alert trail users, including bicycles, to vehicles approaching the trail at the crossing. The intent would NOT be as a regulatory measure that would require path traffic to stop. Vehicles would still be required to yield to trail traffic. Because of the short approach for vehicles approaching on the east side, there would not be enough lead time to stop the majority of bicycles as in many cases they would have passed the required stopping distance (127' for bikes at 20 mph) before a vehicle would have arrived at the sensor points. Slower traveling pedestrians may be too close to the warning lights.

Concerns:

- Would bicyclists and other trail traffic approach crossings without slowing down for potential conflict if warning lights are not flashing? Currently, many bicyclists at least slow down slightly before the crossing. If they are relying on the flashers, will they begin to be less careful at the crossings and continue at their through travel speeds?
- While flashing markers will be visible to bicyclists so they can avoid hitting the indicators while they are actuated, will they be as visible to them while non-activated? What would be the impact to the bicyclist and bicycle/wheel frame if the immobile markers are hit at high speed of travel? The protrusion is only 1/8" so this may not be a problem. Further research is needed.
- Would the flashing be visible to the trail user? The patterns of light and shadow from landscaping and trees surrounding the path may make the strobing of the LED lights difficult to distinguish. Mr. Radford demonstrated some strobe patterns that have been developed for this purpose. Further investigation is recommended.

Scenario 2: Sensors on trail, LED flashers in driveway/roadway pavement serving to warn drivers of approaching trail users

How it would work: LED flashers in pavement would be triggered by all trail traffic. Once trail user triggers sensor, vehicles are warned that traffic is approaching.

Concerns:

- Sensors would have to be set at least 127' down the trail. While this would give enough warning for vehicles to be made aware of approaching bicycle traffic, it would also trigger by pedestrians traveling at a much slower speed.

Because the sensors cannot distinguish between bicycles or pedestrians, the flashers would have to remain on for quite some time after each trigger. If it is a slower moving pedestrian, vehicles would most likely be able to continue their travel after determining if required clearance is available between the approaching pedestrian and the point of vehicle crossing.

- Because the LED lights are likely to be on nearly constantly during some parts of the day (due to the long time period of warning required, as described above) would motorists become desensitized to the warning?

Scenario 3: Sensors and LED flashers on both trail and vehicle approaches.

How it would work: Combination of both applications above. This approach would provide warning to all approaches.

Concerns are same as noted before for both approaches.

Scenario (Option) 4: LED lights in Yield Signs or other Warning Devices

How it would work: In my discussions with Mr. Radford, he mentioned that an alternative to in-pavement marking would be to put the sensors in signs facing the approaches. Advantages over in-pavement placement relate to concerns about trail placement and light/shadow issues as well as impacts to bicycle frames at high speed.

Concerns: All other concerns remain the same, such as concern about timing and placement, reduction of bicyclists caution and self regulated speed control at crossings, length of activation time for vehicle approaches, etc.

CONCLUSIONS

The LED in-pavement flashers would not replace the need for providing prescribed sight triangles. With, or without installation of LED warning flashers, vehicles should still be required to yield to trail traffic. With provision of the prescribed sight triangles and proper yield assignment, with accompanying signage and markings, the flashers would not be necessary. The potential issues of creating a false sense of safety for both trail and driveway users with the installation of such flashers is risky, even under a test program. With provision of proper sight triangles and assignment of yield to approaching motor vehicles, placement of the LED flashers in the Burke Gillman Trail at driveway crossings is not recommended.